

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/613,422 Confirmation No. : 5145  
First Named Inventor : Bull, Lucy M.  
Filed : July 2, 2003  
TC/A.U. : 1797  
Examiner : Prem C. Singh  
  
Docket No. : 103904.B500790  
Customer No. : 23911  
  
Title : Acid Treatment Of A Fischer-Tropsch Derived Hydrocarbon Stream

**DECLARATION UNDER 37 C.F.R. §1.132**

Mail Stop AF  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Charles L. Kibby, hereby declare as follows:

1. I received a Ph.D. in 1964 from Purdue University.
2. I am employed as a Consulting Scientist in the Energy Technology Company, Chevron Corporation. I have been employed by Chevron since 1985 and before its acquisition, Gulf Oil Corp., from 1970 to 1985.
3. My research efforts are in the area of catalyst research and development for applications in refining and chemicals and for upstream applications.
4. I am currently involved in research on hydrocarbon synthesis processes, including Fischer Tropsch, natural gas to methanol and natural gas to chemicals processes. I am an inventor or co-inventor on 29 patents and published patent applications on catalysts and catalytic processes, many of which relate to hydrocarbon synthesis processes.
5. I am familiar with the issues raised in the final Office Action dated January 8, 2009, in the above-referenced application. I understand that in the Office Action, the claims were rejected over U.S. Patent No. 2,877,257 ("Cain") in view of U.S. Patent Application Publication No. 2002/0173556 A1 ("Moore"). I respectfully, but strongly, disagree with the Examiner's conclusions regarding Cain.
6. The Examiner points out that Cain discloses "separation of iron and iron compounds from the hydrocarbon stream which may be in . . . solution or occluded form." (Office Action, Page 9).
7. The Examiner acknowledges that Cain "does not disclose that aluminum is removed from the hydrocarbon." (Office Action, Page 4).

8. The Examiner asserts,

Although Cain does not specifically disclose separation of Al particulates, it is known to those skilled in the art that support materials including alumina are used in the Fischer-Tropsch (FT) catalyst (See Moore, paragraph 0079). Thus, Al will necessarily be present in the FT synthesis product. Thus, in [the] Cain process while iron is separated, Al will necessarily be separated simultaneously.

(Office Action, Page 9).

9. Paragraph [0079] of Moore merely discloses,

Suitable Fischer-Tropsch catalysts comprise one or more Group VIII catalytic metals such as Fe, Ni, Co, Ru and Re. Additionally, a suitable catalyst may contain a promoter. Thus, a preferred Fischer-Tropsch catalyst comprises effective amounts of cobalt and one or more of Re, Ru, Pt, Fe, Ni, Th, Zr, Hf, U, Mg and La on a suitable inorganic support material, preferably one which comprises one or more refractory metal oxides. In general, the amount of cobalt present in the catalyst is between about 1 and about 50 weight percent of the total catalyst composition. The catalysts can also contain basic oxide promoters such as ThO<sub>2</sub>, La<sub>2</sub>O<sub>3</sub>, MgO, and TiO<sub>2</sub>, promoters such as ZrO<sub>2</sub>, noble metals (Pt, Pd, Ru, Rh, Os, Ir), coinage metals (Cu, Ag, Au), and other transition metals such as Fe, Mn, Ni, and Re. Support materials including alumina, silica, magnesia and titania or mixtures thereof may be used. Preferred supports for cobalt containing catalysts comprise titania. Useful catalysts and their preparation are known.

10. Contrary to the assertion of the Examiner, it is *not* true that Al will necessarily be separated in the process of Cain.

11. I understand that Cain is allegedly applicable to a so-called primary oil stream which is separated from the mixture of products produced by synthesis when carbon monoxide and hydrogen are reacted with a promoted iron catalyst at pressures in the range of about 150 to 500 psig and temperatures in the range of 550° to 700°F.

12. I also understand that the inventors of Cain have allegedly found that soluble iron or other similar metal contaminants and amines can be readily removed from hydrocarbon solutions by subjecting the latter to extraction with an aqueous acid solution.

13. I understand that the Examiner, in the final Office Action dated January 8, 2009, maintains that it would have been obvious, in view of Cain, to pass a hydrocarbon stream to a treatment zone where the hydrocarbon stream contacts an aqueous acidic stream to remove Al contaminants from the stream. I respectfully disagree with that assessment. There is no evidence, either in Cain or in other publications, that the hydrocarbon solution of Cain necessarily contains Al contaminants.

14. The catalyst in Cain is an iron catalyst. While there is no indication in Cain of the form or composition of the iron catalyst, significant numbers of prior literature suggest that this was a bulk, unsupported iron catalyst.

15. Skilled catalyst scientists have attempted for years to synthesize a suitable supported iron catalyst for Fischer-Tropsch service. U.S. Patent No. 7,259,286 ("the '286 patent", issued August 21, 2007) is exemplary. The '286 patent teaches an attrition resistant bulk iron Fischer-Tropsch catalyst, prepared by precipitation of iron compounds.

16. According to the '286 patent, a supported iron catalyst is not preferred when compared to a bulk iron catalyst for Fischer-Tropsch service:

Bulk iron catalysts, i.e., iron catalysts having an iron content, calculated as  $\text{Fe}_2\text{O}_3$ , exceeding about 50 weight percent (wt. %) prepared by precipitation are preferred catalysts, as compared to bulk iron catalysts prepared by fusion, or to supported iron catalysts prepared by impregnation of iron onto a support because of the high activity and selectivity of the precipitated bulk iron catalysts.

(Column 2, Lines 12-19).

17. The '286 patent further explains that when employed, a supported iron catalyst has been found to have much lower catalytic activity:

Although the use of catalyst supports such as alumina (prepared as spheroids by spray drying) can improve catalyst attrition resistance, supported iron catalysts are generally limited to an iron oxide content of less than 30 wt. %, and have been found to have much lower activity compared to bulk iron catalysts for FTS [Dry, (1980); Anderson, (1984); Bukur, D. B., et al., *J. Catalysts*, Vol. 29, p. 1588, (1990)].

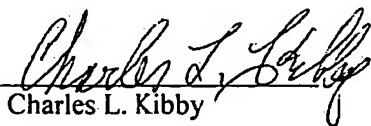
(Column 2, Lines 47-54).

18. Accordingly, as one of skill in the art, I would understand the iron catalyst of Cain to be a bulk, unsupported iron catalyst. It is by no means inherent in the process of Cain that Al contamination was present. As an unsupported catalyst, there would be no Al contaminants present.

19. Nor is there any teaching in Cain to suggest that an acid treatment could be extended to Al contamination. Cain relates to removal of soluble iron or other similar metal contaminants and amines. Thus, one of skill in the art, when faced with the problem of Al contamination in a Fischer-Tropsch derived hydrocarbon stream, would not look to Cain for guidance on how to remove Al contamination from a Fischer-Tropsch process.

20. All statements made herein of our own knowledge are true, and all statements made on information and belief are believed to be true, and further, these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the '555 application or any patent issued thereon.

Signature: \_\_\_\_\_

  
Charles L. Kibby

Date: \_\_\_\_\_

3/25/2009